

What is claimed is:

1. An apparatus for producing DLC (diamond-like carbon) film-coated plastic containers, which comprises an outer electrode unit disposed outside a plastic container, an inner electrode disposed inside the plastic container, a degassing unit for reducing the inner pressure of the plastic container, a gas feeding unit for feeding a raw material gas of a carbon source into the plastic container having been degassed by the degassing unit, and a power source unit for applying a voltage between the outer electrode unit and the inner electrode with a carbon source gas being fed into the container, thereby to generate plasma to form a DLC film on the inner surface of the plastic container; wherein the outer electrode unit comprises a first outer electrode disposed along the bottom of the plastic container, and a second outer electrode disposed along the body of the plastic container, and the upper edge of the first outer electrode is positioned below the center between the top and the bottom of the plastic container.

2. The apparatus for producing DLC film-coated plastic containers as claimed in claim 1, wherein the power source unit applies a higher power to the first outer electrode than to the second outer electrode.

3. The apparatus for producing DLC film-coated plastic containers as claimed in claim 1 or 2, wherein the outer

electrode unit is provided with a third outer electrode disposed along the shoulder of the plastic container.

4. An apparatus for producing DLC film-coated plastic containers, which comprises an outer electrode unit disposed outside a plastic container, an inner electrode disposed inside the plastic container, a degassing unit for reducing the inner pressure of the plastic container, a gas feeding unit for feeding a raw material gas of a carbon source into the plastic container having been degassed by the degassing unit, and a power source unit for applying a voltage between the outer electrode unit and the inner electrode with a carbon source gas being fed into the container, thereby to generate plasma to form a DLC film on the inner surface of the plastic container; wherein the outer electrode unit comprises a first outer electrode disposed along the bottom of the plastic container, a second outer electrode disposed along the body of the plastic container, and a third outer electrode disposed along the shoulder of the plastic container.

5. An apparatus for producing DLC film-coated plastic containers, which comprises an outer electrode unit disposed outside a plastic container, an inner electrode disposed inside the plastic container, a degassing unit for reducing the inner pressure of the plastic container, a gas feeding unit for feeding a raw material gas of a carbon source into the plastic container having been degassed by the degassing unit, and a

power source unit for applying a voltage between the outer electrode unit and the inner electrode with a carbon source gas being fed into the container, thereby to generate plasma to form a DLC film on the inner surface of the plastic container; wherein the outer electrode unit comprises a first outer electrode disposed along the bottom of the plastic container, a second outer electrode disposed above the first outer electrode and along the outer periphery of the plastic container, and at least two other outer electrodes disposed above the second outer electrode and along the outer periphery of the plastic container.

6. The apparatus for producing DLC film-coated plastic containers as claimed in claim 4 or 5, wherein the power source unit applies a higher power to the first outer electrode than to the second outer electrode.

7. A method for producing DLC film-coated plastic containers, which comprises disposing a first outer electrode outside a plastic container along the bottom of the plastic container and in such a manner that the upper edge of the first outer electrode is positioned below the center between the top and the bottom of the plastic container, disposing a second outer electrode outside the plastic container and along the body of the plastic container, disposing an inner electrode inside the plastic container, degassing the plastic container, then feeding a raw material gas of a carbon source into the

plastic container, and applying a voltage between the first and second outer electrodes and the inner electrode thereby to generate plasma to form a DLC film on the inner surface of the plastic container.

8. The method for producing DLC film-coated plastic containers as claimed in claim 7, wherein a higher power is applied to the first outer electrode than to the second outer electrode.

9. A method for producing DLC film-coated plastic containers, which comprises disposing a first outer electrode outside a plastic container and along the bottom of the plastic container, disposing a second outer electrode outside the plastic container and along the body of the plastic container, disposing a third outer electrode outside the plastic container and along the shoulder of the plastic container, disposing an inner electrode inside the plastic container, degassing the plastic container, then feeding a raw material gas of a carbon source into the plastic container, and applying a voltage between the first, second and third outer electrodes and the inner electrode thereby to generate plasma to form a DLC film on the inner surface of the plastic container.

10. A method for producing DLC film-coated plastic containers, which comprises disposing a first outer electrode outside a plastic container and along the bottom of the plastic container, disposing a second outer electrode outside the

plastic container and above the first outer electrode, disposing at least two additional outer electrodes outside the plastic container and above the second outer electrode, disposing an inner electrode inside the plastic container, degassing the plastic container, then feeding a raw material gas of a carbon source into the plastic container, and applying a voltage between the first and second outer electrodes combined with at least two other outer electrodes above the second outer electrode, and the inner electrode thereby to generate plasma to form a DLC film on the inner surface of the plastic container.

11. The method for producing DLC film-coated plastic containers as claimed in claim 9 or 10, wherein a higher power is applied to the first outer electrode than to the second outer electrode.

12. A DLC film to be formed on the surface of a plastic molding and having a thickness of from 50 to 400 Å.

13. The DLC film as claimed in claim 12, which is formed on the surface of a plastic molding and has a hydrogen content of from 16 to 52 hydrogen atomic %.

14. A DLC film to be formed on the surface of a plastic molding and having a hydrogen content of from 16 to 52 hydrogen atomic %.

15. The DLC film as claimed in claim 12, 13 or 14, which has a density of from 1.2 to 2.3 g/cm³.

16. A DLC film-coated plastic container having a DLC film on its inner surface, wherein the DLC film has a thickness of from 50 to 400 Å.

17. The DLC film-coated plastic container as claimed in claim 16, wherein the DLC film has a hydrogen content of from 16 to 52 hydrogen atomic %.

18. A DLC film-coated plastic container having a DLC film on its inner surface, wherein the DLC film has a hydrogen content of from 16 to 52 hydrogen atomic %.

19. The DLC film-coated plastic container as claimed in claim 16, 17 or 18, wherein the DLC film has a density of from 1.2 to 2.3 g/cm³.